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RADIUM

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AND
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VOL. VIII MARCH, 1917 No. 6

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A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES

RADIUM

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY, PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES.

Edited and Published by Charles H. Viol, Ph. D., and William H. Cameron, M. D. with the assistance of collaborators working in the fields of Radiochemistry, Radioactivity and Radiumtherapy.

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VOL. VIII. MARCH, 1917 No. 6

RADIUM IN VARIOUS SURGICAL CONDITIONS*

By Joseph B. Bissell, M. D.

NEW YORK CITY.

It is designed in this short paper to consider the use of radium in some of the usual surgical diseases, not including cancer. Besides the many important physical and chemical qualities of radium already in general knowledge other unutilized properties are constantly being developed in the different research, physiological and chemical laboratories throughout the world. Consideration of the subject offers interesting speculation aside from the effect upon malignant tissue. In fact it is not so certain that the action of radium may not cause changes in other pathological conditions, both medical and surgical, of greater importance than in cancerous growths. This is not to depreciate its action in attacking local manifestations in morbid changes in human structures and functions. Nor is it to minimize the role of radium in cancer. In certain forms of malignancy the results of radium treatment are so satisfactory and so striking as to seem almost miraculous. This statement is not confined to the superficial skin cancer alone, but relates to pathological growths involving the deeper tissues, and in some cases, even to extensive malignant infiltrations in widely different parts of the body.

As a therapeutic agency, the writer has made use of this remedy in several hundred non-malignant cases in Bellevue and St. Vincent's Hospital, in the Radium Sanitarium of New York, and in private practice. The results have been instructive, interesting, sometimes puzzling, and frequently gratifying. I have tried to make our knowledge of the varying properties of radium fit the indications for treatment.

*New York State Journal of Medicine, Vol. 16, No. 12, Dec. 1916. Read at the Annual Meeting of the Medical Society of the State of New York at Sartoga Springs, May 17, 1916.

The destructive, the absorbing and the constructive properties of radium, as well as some if its abstruse chemical actions are also taken into consideration; for instance, knowing by experience of the stimulating effects of some of its rays, endeavor was made to use this quality in sluggish suppurating ulcers and sinuses associated or not with diseased bone. In this short but rather discursive paper numerous unconnected pathological states are considered and treated without reference to their relationship to each other or to any single disease condition. The application of radium has varied from the treatment of unhealthy and unhealed ulcers of different types to fibroids of the uterus, and from a keloid of the scalp to the cure of a callosity on the toe. In the course of these wide excursions results are obtained which give rise to thought and consideration and assist us in determining more definitely the uses and utilities of this element.

Following are the cases:

Miss B., thirty years of age. She has an inflamed, thick, hard corn on right little toe. It has been present over a year. Radium applied twenty minutes each time, with no visible reaction. No screening. After six applications, four or five days apart, the corn entirely disappeared, without local irritation to the neighboring skin.

Mr. B., twenty-nine years old. December 16, 1914. Has an inflamed corn on the ball of left foot, at least one and a half inches long, and one inch wide. It is exquisitely tender on pressure. He walks with difficulty and with the aid of a cane. The callosity has been cauterized and cut out repeatedly, but always returned. Ten milligrams of radium applied for fifteen minutes at the first application. Five days later a large amount of callous was removed in the center of the corn, and into this hole thus left a tube containing twenty-five milligrams of radium, unscreened except for the silver casing, was applied for fifteen minutes. The surrounding tissues were protected by one millimeter lead screening, covered with two millimeters of rubber. This procedure was used several times at six-day intervals. Subsequent examination showed patient to be entirely relieved. He was able at the end of a few weeks to return to his business as superintendent of a mine.

Mrs. C. deR., May 13, 1915. Fibroid of uterus. Fifty-one milligrams of radium applied in the cervix for five hours. June 20, fifteen milligrams applied for ten hours. September 1, report from doctor in charge finds on examination that the growth has markedly decreased in size. Symptoms of hemorrhage and pain and pelvic discomfort have ceased, and three months later the growth was so small that an operation was unnecessary

Mrs. S. M. H., forty-seven years old. April 3, 1915. Fibroids. One tumor, size of a small orange on the anterior surface of uterus. Large fibrous os. April 3, fifty-one milligrams of radium, in one tube, applied in the cervical canal for twenty hours. Complains of considerable nausea during the application. On the fourth day after the application patient developed what was thought to be grippe, with headache, sore throat, cough, and temperature running to 104. April 10, last night, however, the temperature was only 99.8 and she came to the sanitarium this morning for another application. Cervix is congested, tender, swollen, bleeds easily and she has a rather profuse discharge. Fifty milligrams applied as before. Complains again of nausea. No pain except a backache. Tube removed at 9 P. M., after a ten-hour application. April 12, her doctor telephoned this morning that she had a

temperature of 105.6, severe headache, rectal tenemus, slight diarrhoea, frequent and painful urination and other symptoms of local irritation. She had a very stormy time following this, with temperature, chills, bloody urine, pain in kidneys and ureter region, all symptoms of a hemorrhagic pyelitis. This condition lasted about three weeks then slowly disappeared. When examined May 10, only a vestige of the anterior fibroid remained and the os was soft and patulous, with no evidences of fibroids. In this case there was a severe infection extending up one or both ureters from a radium burn of the uterus. She had also a moderate proctitis probably of a similar origin. Eventually the patient made a complete recovery from these conditions.

Marie D., twenty years of age, telephone girl. April 3, 1915. Keloid, one inch in diameter on the right breast. This followed a scald four years ago. Fifteen milligrams applied in varnish applicator for thirty minutes. April 11, slight blister and swelling over the lesion. Twenty-five milligrams of radium in tube applied for ten minutes. April 19, varnish applicator five milligrams and tube of ten milligrams, applied with rubber screening for ten minutes. June 27, 1915, the keloid is about half its former size, and very much thinner. Applied two five millimeter varnish applicators over the soft keloid for twenty minutes. In September, when she reported for final examination, there was only a thin white scar remaining.

Angeline F., seventeen years of age; milliner. November, 1915. A keloid scar four inches long, half an inch wide, at some points elevated a quarter of an inch. It runs directly across the left cheek from her ear. Radium applied twenty to thirty minutes, once a week, fifteen times. Keloid has softened and only the soft scar remains when she ceased treatment, February 15, 1916.

N. McC., female, thirty-seven years of age, seamstress. February 22, 1915. Second toe of right foot amputated for osteomyelitis. The wound did not heal because of dead bone. On admission to the hospital she had an indolent sinus from which protruded flabby granulations. This sinus had been irrigated every day with various solutions without any improvement until March 7, when ten milligrams of radium were applied in the sinus for ten minutes. The three following days the discharge was very much less, the granulations became smaller and the pain, swelling and tenderness disappeared at the end of a week. March 18, a second application of radium was made for ten minutes. Improvement continued and on April 4 patient was discharged cured.

H. D. L., fifty years old, single; brushmaker. Admitted to St. Vincent's Hospital, August 5, 1915. He had a history of osteomyelitis of the right knee, twenty-five years before. Now an acute arthritis of the knee, which had lasted two weeks. At present the knee is twice as large as the opposite one, red swollen and tender, has several fluctuating points, and is discharging profusely from a sinus on the upper side of the leg just above the joint. August 6, several incisions were made into the soft points and large quantities of pus discharged from these incisions. Temperature 104 and pulse 150. August 25, there were several sinuses about the joint discharging sero-purulent fluid so copiously that the dressings have to be changed twice a day. X-ray picture at the time shows septic infection of the knee joint, involvement of the lower end of the femur, patella and tibia; cartilage destroyed. August 27, the destruction of the joint was apparently so complete and the extension into the bony structure so marked that amputation of the leg at the

upper third of the hip was advised. Patient refused operation. 100 milligrams of radium applied in the different sinuses, in five tubes, for ten minutes. At the end of three or four days after this application the discharge was very much less, redness and pain greatly improved, and the knee was markedly smaller. September 8, radium applied as above, after which the discharge continued to diminish, pain decreased and the swelling about the joint also lessened. The discharge cleared up so rapidly that on October 1 several of the sinuses were healed, and there was only a slight discharge remaining. Dressings were changed only every third or fourth day instead of as previously, twice daily. October 25, another application of radium was given for twenty minutes. As only one sinus was still discharging, a tube of twenty milligrams of radium was put into this sinus, the remainder of the 100 milligrams of radium being strapped around the joint at equi-distant points. November 25, discharge practically absent; last sinus closed; knee joint seems to be ankylosed, but no longer tender or with fluctuating points. Patient was up and about the ward on crutches. November 25, a point of fluctuation appeared just below the patella. This was incised, small pocket of pus evacuated and it was healed by December 7. January 7, 1916, patient discharged cured, with ankylosed, but useful knee joint. He is able to go about his business with the help of a cane.

S. B., forty-three years of age, male, married, laborer. Admitted to hospital July 8, 1914. A few days previous patient had been injured by having his knee caught between a car and a packing box. On examination his right knee was swollen, red, hot and tender. A small punctured wound is seen on the lateral internal aspect. Pressure caused a copious discharge of purulent, oily like material; evidently the injury communicates with the joint. Leg flexed and very tender to the touch. Has had chills; temperature, 104, pulse, 140. July 11, wound enlarged and tube inserted for drainage. Joint fluid and pus discharging through tube. Diagnosis acute purulent sinovitis. Knee and the patient's general condition became steadily worse, and as the joint seemed to be pretty well disorganized, amputation was advised and refused. Several points of suppuration were opened and drainage tubes inserted into the joint. A week later, after amputation was again refused, 100 milligrams of radium in divided doses were applied through the tube in the knee joint for twenty minutes. Within a few days the knee began to show signs of improvement. September 7, radium applied again as above for ten minutes. September 23, marked improvement. There is very little tenderness and the knee is resuming its normal shape, but is still flexed at an obtuse angle of about twenty degrees. All the sinuses are healed except two, and from them there is very little discharge. Radium applied in these two sinuses and around the circumference of the knee for about ten minutes. October 8, radium applied to the only remaining sinus for ten minutes. October 20, all sinuses are healed, and on November 30, after remaining in the hospital in order that the stiffness and pain on attempt at motion should be treated by baking, he was discharged cured, with ankylosis at about an angle of twenty degrees.

Rose E., seven years of age; came into the hospital July 14, 1915, with a swelling over the first metatarsal bone of the foot. No history of injury. There are three small sinuses in this region. The X-ray shows an osteitis in the first and second metatarsal bones. She was treated in the usual surgical manner up to September 6, with no im-

provement. September 8, radium applied for ten minutes, and again on September 25, for ten minutes. After the first application swelling began to subside, the ulcers around the sinuses began to contract and heal up and the discharge to decrease. October 1, radium again applied for ten minutes. October 15, only one sinus remained, the ulcers have healed up, swelling is much less, and there is no discharge. Without further treatment of any kind this patient continued to improve and was discharged November 1 as cured. The case was apparently one of tubercular osteitis.

These uses of radium, with one exception, are not new. In 1910, Dr. Wickham of Paris, reported over sixty cases of fibroids treated in the way just described. Following treatment, hemorrhage and discharge ceased, pain and discomfort disappeared and the tumors themselves diminished in size or were entirely absorbed.

The removal of benign growths like callosities or keloids is of course known to us all, and is a very satisfactory and frequent result of the use of radium. The exception spoken of above is the local usage of radium in bone and sinus work, and as far as I know is original with the writer. In a recent issue of the *Pennsylvania Medical Journal*, Dr. W. H. Cameron* described the effects of radium applied locally to a number of patients in the army camps in England. These soldiers for the most part were suffering from sluggish ulcers, indolent infected wounds and unhealed sinuses. They were treated in the manner instituted by the writer personally at these English camps last summer, and Dr. Cameron expressed satisfaction at the results obtained after he had made a satisfactory personal examination of many of these men.

REVIEWS AND ABSTRACTS.

M. L. Heidingsfeld, M. D. (Cincinnati, O.). Radium Treatment of Rhinophyma and Hypertrichosis. (Presented before the Academy of Medicine of Cincinnati, May 1, 1916). The Lancet-Clinic, Vol. 116, No. 13, Sept. 23, 1916, pp. 305-7.

"This man, fifty-five years of age, is presented on account of his unusual condition and to show the result of radium treatment. The patient presented himself for the first time, February 26, 1916, when the present cauliflower excrescence on the crest of the nose was possibly half again as large as it is at present. The case is a very marked and extreme type of rhinophyma, which is essentially an adenoma of the sebaceous glands of the skin. It is at the present time approximately the size of a large English walnut. Before radium was used in these cases, surgical ablation gave good results. There was, however, always a considerable degree of disfigurement from such a procedure. In several of these cases I have used radium, which has not only cleared up the condition but has produced almost perfect cosmetic results. This patient is presented in a preliminary way, after five applications of radium."

"Mrs. A. R., is presented not only as a case of extreme hypertrichosis, but also in order to demonstrate the effects of radium in cor-

*See also Radium, VII, 45, May, 1916.

recting this unpleasant disfigurement. The patient was treated for the first time on March 6, and three applications have been made with the result that whenever radium has been applied, the hair has been completely and apparently permanently removed."

"When the patient first presented herself, there was a heavy growth of hair over the chin and neck, almost as marked as that in an adult, fully developed male. Most of this has already been scccessfully removed and the patient is shown at this partial stage of recovery, in order to best illustrate the success of radium treatment in this condition. It is painless, rapid and effective in character, and the cosmetic result is far better than that which can be accomplished by the only other reliable method of treatment, namely, the needle and galvanic current."

DISCUSSION.

"DR. C. J. BROEMAN: Referring to the case of hypertrichosis, I have quite a number of cases of this kind under treatment. Wishing to receive an opinion concerning them from men with large experience in both *x*-ray and radium work, I wrote DR. KELLY concerning the radium treatment, and he turned the matter over to his assistant, DR. BURNAM, who wrote me, saying that radium could be used with perfect safety. He failed to mention whether he himself had ever used it to treat such a case, or whether he had obtained any results. I then wrote to DR. MCKEE, of New York, with regard to the propriety of using the *x*-ray in this condition; his reply was never to use the *x*-ray in such cases."

"If the patient presented to-night has been permanently cured, then radium has certainly proven a wonderful remedy. I have treated a number of cases in which radium has previously been used without effect and I am now using the electric needle on one case in which radium seemed to make the condition worse. The cosmetic effect, however, is not as good as that exemplified in DR. HEIDINGSFELD'S case, and, I think, there is some question as to whether the case is permanently cured."

"DR. HEIDINGSFIELD (in conclusion:) Of coures, the fundamental question regarding radium is whether or not the results obtained from its use are permanent. Not six months or even a year is sufficient to determine a cure. Radium has been used a great many years by some men, who claim they have not had permanent results. The tendency to return is very much in evidence. On the other hand, there are some who claim to have had very satisfactory results."

* * * * *

Benjamin S. Barringer, M. D. (New York). The Treatment by Radium of Carcinoma of the Prostate and Bladder. Preliminary Report. Journ. A. M. A., Vol. LXVII, No. 20, pp. 1442-45, Nov. 11, 1916.

"In October, 1915, at the Memorial Hospital, we began treatment by radium of cases of carcinoma of the prostate and bladder. At this early date obviously no final results of our treatment can be predicted. In certain cases, however, our primary results have been good. This, together with the fact that the technic of the application of the radium particulary in prostate carcinomas, is new, encourages us to give this report."

"Problems presented by bladder and prostate carcinomas are so entirely different that they will be considered separately."

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CARCINOMA OF THE BLADDER.

"The cases considered in this paper are not papillomas which may have undergone at one place or another carcinomatous degeneration, but rather flat sessile tumors, sometimes cauliflower, sometimes hard, sometimes multiple, generally sloughy in part. The cystoscopic picture or the rectal feel may suggest an indurated base. Microscopically they show carcinoma. Fulguration does not particularly affect this tumor."

"Technic of Using Radium.—There are a number different facts connected with these tumors which have determined our method of treatment."

"1. These patients often have a great deal of pain both connected with and between urinations. We have tried not to increase their pain and discomfort; in other words, if we do not succeed in curing, we can at least say that we have not made them materially worse. We have not been altogether successful in this. The extent of the carcinoma, the presence of urinary retention, the involvement of the prostatic urethra, and other factors, seem to make it more or less impossible to determine accurately the amount of pain a patient will have from radium treatment."

"2. In the first case in which we used radium, the bladder was opened suprapubically and the radium attached by hooks to the tumor. It took this man nearly three months to get out of the hospital. He had sloughs in his suprapubic wound for a long time and his physical condition at present is the worst of any of the patients treated. For this reason I have at least temporarily given up this method."

"3. I believe that the problem of destroying carcinoma of the bladder by radium is, in most cases, largely one of accuracy in applying the radium to the growth. This has been the experience of those who have used radium treatment in uterine carcinoma. Therefore we have not used irradiation by means of rectal tubes or suprapubic application, but have tried to place the radium on the growth in the bladder. I have tried to use the radium in such quantities and over such periods of time that undue sloughing and burning of the normal portion of the bladder will not result."

"The method which I use at present is as follows:

From 100 to 200 millicuries of radium screened with 0.6 mm. of silver and 1.5 mm. of rubber are put up so as to form a capsule about 1 inch long and one-eighth inch in diameter; to this is attached a long stout double linen thread. A direct cystoscope is introduced into the bladder, the capsule put through its sheath and the cystoscope withdrawn, leaving the radium in the bladder. The linen thread attached to the tube runs through the urethra and appears at the meatus. In women one may reintroduce a small cystoscope and see if the radium lies on the tumor. The patient remains in bed during the application. This perhaps is a crude and inaccurate way of applying the radium. On the other hand, a large majority of bladder carcinomas are in the base, and the tube of radium cannot be very far from a carcinoma in this position; certainly much nearer than a rectal or suprapubic tube would be. If the carcinoma is located on one side of the bladder, the patient is told to turn slightly toward that side while the radium is applied. The patients generally have been able to urinate without trouble during the application. Some have held their urine until the end of the irradiation, at most eight hours, and then urinated or were catheterized after the

radium was removed. The urine possibly to some extent screens the vault of the bladder (all of my patients to date have had carcinoma of the base) and also lifts the bladder mucous membrane of the vault away from the radium. Whatever may be the reason, the normal bladder mucous membrane seems very resistant to radium burns when the radium is used in this way."

"*Duration of Radium Burns.*—There is much variation in the effect of any given dose of radium. The radium does not, as a rule, change the appearance of the tumor; that is, a red cauliflower tumor generally remains red after the radium burn, but it appears to be softer, and fulguration of the tumor has a much greater effect than before the irradiation. On the other hand, sloughing sometimes occurs and presists even for a number of months. My rule is not to reapply radium until a patient has entirely recovered from the effects of the first application."

"*Danger of the use of Radium.*—I have lately heard of one case in which radium was used, quantity, time on screening not known, in which the patient some two and one-half months after the irradiation died of a ruptured bladder. This case emphasizes the fact that if the tumor is at all extensive it is very difficult by the cystoscope to tell exactly the amount of bladder involved. Cystographs may help some. It is possible that further experience will indicate that, in extensive carcinomas, we should do a suprapubic observation of the exterior of the bladder. If we find that the carcinoma has penetrated the bladder, radium treatment is probably both useless and dangerous."

REPORT OF BLADDER CASES.

"Nine bladder tumors have been irradiated."

"*Extent of Growth.*—In one of these cases the growth was absolutely inoperable. In another case the growth should be classed as a prostatic carcinoma with secondary invasion of the bladder. In five other cases the extent of the growth indicated that total cystectomy would have been the only operation to offer anything. In another case partial cystectomy, with the reimplantation of the left ureter, would have been possible, while in another the growth itself possibly could have been removed."

"*Microscopic Examination.*—In six of the nine cases the diagnosis of carcinoma has been confirmed by the micoscopic examination of pieces taken from the growth. I believe that in all cases the diagnosis must be confirmed by the microscope. But when once confirmed the cystoscopy and the rectal feel give us much more trustworthy data as to the extent of the tumor and the prognosis in a given case than does the microscope."

"*Result of Treatment.*—One patient died three months after irradiation. This patient had an extensive inoperable carcinoma of the bladder base; three patients have been too recently treated to make any report. Another patient is definitely getting worse. This is the patient in whose case the radium was applied through the suprapubic opening in October, 1915. I have never been able to examine this patient with the cystoscope to see the effect of the radium on the bladder, but he is losing weight and having more frequent and more painful urination. In two other cases the symptoms are about the same, and the patient's general condition is slightly improved, but the carcinoma still persists. One of these was treated with radium about three months ago, and the other was

treated several times, beginning in October, 1915. In two of the nine cases the growth has disappeared. One has only recently been examined cystoscopically, notwithstanding the radium was applied in February, 1916. In the other the growth has been absent (by cystoscopic examination) for three months. These last two cases are of enough interest to report in some detail."

"CASE 1.—C. T., man, aged 59, came to Dr. Keyes in January, 1916, and stated that since June, 1915, he had had occasional attacks of painless hematuria. In July, there had been two bloody emissions, though he had been impotent for ten years. At that time a papilloma was found, and since then he has been fulgurated four times—October 22, November 1, December 9, and January 11. Because of the return of the growth it is suspected to be carcinoma. Dr. Keyes reports a sloughy ulcer about the left ureteral orifice with definitely carcinomatous looking lumps in the edge. A piece was removed which Dr. Ewing reports as diffuse carcinoma, and the growth was burned again with the high frequency current. Three weeks later, 214 millicuries of screened radium were left in the bladder for seven hours. After the irradiation the patient went to his home and had various ups and downs, an attack of grip, etc. Three days after the irradiation and for a period of two weeks, he arose five to six times at night to urinate, but had no special burning on urination. From that time on the frequency has diminished. He was examined cystoscopically, May 2, 1916, at which time no trace of the original tumor could be detected. The entire bladder was slightly congested, and there were a few bullae about the bladder orifice. He is the picture of health, and there is no hardness felt in the prostate or the base of the bladder."

"CASE 2.—C. A. G., woman, aged 69, had painful and frequent urination for one year, three or four times at night, and by day every three to four hours. She has been passing bloody urine for some time. She was examined cystoscopically some months before I saw her, and a diagnosis made of inoperable carcinoma of the bladder. Cystoscopy revealed a large red cauliflower tumor with small necrotic areas on the left side of the bladder base. I had some difficulty in determining its full extent. It probably was as large as half a dollar and sessile. It was directly over the left ureteral orifice, which could not be seen. Dr. Ewing reports carcinoma. I burned the tumor twice with high frequency current, but this had little or no effect on it, and I considered it useless to continue. January 4, I put 100 millicuries of screened radium in the bladder and left it in eight hours. The patient went out of town the next day and at the end of three days had severe bladder pain with increased urinary frequency so that she urinated every hour. Two days later she was absolutely normal as to pain and urinary frequency."

"February 4, cystoscopy revealed that the tumor was gone. The ureter was in plain sight and covered with normal mucous membrane. The patient had a little pedunculated papilloma of the bladder neck, which was burned. Dr. Keyes confirmed my examination. April 28, cystoscopy revealed that there was still no tumor. She had a slight cystitis (caused by retention of urine due to a cystocele)."

"Whether the carcinoma in these cases will return or not, no one can say. I believe that the fact they have reacted so quickly to radium may indicate that we have eradicated the growth. Only time will tell, however."

CARCINOMA OF THE BLADDER.

"The problem involved in the diagnosis and treatment of carcinoma of the prostate is different from that of carcinoma of the bladder. In the first place is the difficulty in diagnosis. An extensive carcinoma which runs up into the vesicles can usually be exactly and positively diagnosed by palpation. On the other hand, a carcinoma as extensive as this is probably beyond the hope of cure. If the carcinoma, as far as can be determined by palpation, is confined to the limits of the prostate, then the diagnosis by palpation alone is sometimes not only difficult, but impossible.

In a recent case which I treated with radium there were two positive diagnoses, including my own, which was possibly biased, one of "very suspicious," one of merely "suspicious" and two indeterminate. As Geraghty has pointed out, palpation of the median lobe on a sound introduced into the urethra is of assistance. It has been suggested that enough of the prostate for microscopic diagnosis can be obtained by the introduction of a trocar through the perineum into the suspected prostate. In one of my cases part of a carcinomatous lobe was removed and the diagnosis made from this. Such a procedure, however, is not ideal, as it might make the carcinoma grow more rapidly. If one treats cases which one is sure are carcinomas of the prostate, but in which a microscopic diagnosis has not been made, and makes such patients temporarily or permanently better, one will, of course, run a risk of dealing with cases which were not carcinomatous."

"*Treatment.*—The operation after Legueu, Young and others apparently succeeds in curing the disease in a certain number of cases. The operative mortality is probably between 10 and 20 per cent., and the cured cases very few. Aside from the mortality, one objection to the operation is the fact that many patients are left with partial or complete incontinence. Because the results of an operation are unsatisfactory, radium has been employed in attempts to destroy the growth. Irradiation has been both rectal and urethal. Pasteau and Degrais[1] report a number of cases in which the radium in the prostatic urethra or bladder gave a marked diminution of the size of the prostate and a decided improvement in symptoms. One patient three and one-half years after treatment by radium was is excellent health, with a small regular movable prostate and clear urine. This carcinoma had extended through into the bladder. Geraghty, applying radium by way of the urethra, has been able to relieve the symptoms of frequent urination, tenesmus, etc., in a number of cases, but has been unable to cause any appreciable diminution in the size of carcinoma."

"*Technic of Application of Radium.*—Because the carcinoma starts in the interior of the prostate gland, and radium by urethra or rectum often causes intense irritation, I have applied the radium differently. A needle 4½ inches long and about 18 gage has been used. From 50 to 100 millicuries of radium have been placed in the end of this needle for a distance varying between ¼ inch to 1½ inches according to the indications of the individual case. The patient is placed in a lithotomy position, a finger introduced into the rectum and the perineum between the urethra and rectum is anesthetized with novocain (1 per cent.).

1. Pasteau and Degrais: Radium in Cancer of the Prostate, Jour. d'urol., September, 1913.

I have frequently inserted the needle without anesthetization, causing very little pain. The radium needle is then plunged into the perineum between the urethra and rectum, and, guided by the rectal finger, the end of the needle is passed into the middle of one or the other of the carcinomatous lobes.[2] After the needle is introduced, the patient frequently does not feel its presence. The needle is left in place from four to six hours. If one wishes to irradiate the other lobe, the needle is pulled out of the first lobe and introduced into the second and left there the proper time. The ease of this procedure is obvious. I was nearly dissuaded from using this method by reports of necrosis following the use of unscreened radium. I have now used the needles in the prostate fifteen times, and to date have had no radium sloughs. These patients are apt to have burning and pain beginning the week after the radium is used and lasting from one to two weeks. During this time the prostate swells, and the maximum effect of the radium on the growth is not to be looked for until two or three months. Some patients, notably those with the carcinoma extending into the vesicles, have a great deal of pain. Neither the pain, however, nor the urinary disturbance are as great as when the radium is used in the bladder. And curiously enough radium in the urethra seems to cause or increase an already present residual urine; while this needle method, as far as I have observed, does not. There is a certain class of borderland cases in which the carcinoma has broken through into the bladder neck and in which the cancinoma has broken through into the bladder neck and in which radium in the bladder neck. I think these cases should be started with prostate needles, as the reaction is often little or nothing."

REPORT OF CASES.

"Extent of Lesion.—Five patients have been treated by the needle method.[3] In but one of these cases was a specimen obtained for pathologic examination. In this case the bladder was opened suprapubically, and one lobe of the prostate removed and found to be carcinomatous. In two of the cases there was every extensive carcinoma of the prostate with involment of the vesicles. In another case there was but little involvement of the vesicles, but a large hard irregular unmistakable carcinomatous prostate. In the fifth case there was a doubt of the diagnosis. Dr. Keyes and I thought it to be carcinoma. Another surgeon said that it was "very suspicious," still another "suspicious," and two refused to give an opinion."

"Number of Treatments.—In one case I inserted the needle four different times; in the four other cases I used the needle only once. The largest dose of radium that I have used in a needle is 102 millicures for four and one-half hours in one lobe, and the same needle was changed to the other lobe, and remained there four hours. I have never seen a slough from the use the needle, although I prefer to begin with small doses at first, from 50 to 75 millicuries for six hours."

"Results of Treatment.—One patient died two months after the irradiation. He had an extensive carcinoma of the prostrate and vesicles. The immediate cause of his death I do not know. One of the patients has been too recently irradiated to determine the result. The other three patients have improved symptomatically."

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2. The needle in the prostate also serves to exclude prostatic stone, the one condition hard to differentiate from carcinoma.

3. A sixth patient was treated by radium inserted in the rectum. In this case there was considerable irritability and urinary retention, and the patient finally died uremic. I have not included him in the foregoing series.

"One who was irradiated in December, 1915, directly after suprapubic exploration (by another surgeon) I have been unable to reach to examine. I have heard indirectly, however, that he is up and doing a good day's work. This is all I know about him."

"The second, a possible borderland case, was treated Feb. 8, 1916. He had just before the irradiation an acute retention of urine. For six months prior to this he had a night urinary frequency (from two to four times). The radium needle caused absolutely no pain and no urinary disturbance. When seen, May 3, 1916, his prostate was considerably reduced in size. He had gained a few pounds in weight, he had no night frequency and was doing a full day's work. During this time he had no urethral instrumentation."

"The last patient is decidedly better symptomatically, and his prostate is so much reduced that if I did not know his history I would have much difficulty in convincing myself that he had any carcinoma. He was first seen in November, 1915. He gave a history of night urinary frequency of from six to eight times for four months, and some pain running down his right thigh for five years. There had been no erections for one and one-half years. He weighed 116 pounds. He had lost about twenty pounds. Both lobes of the prostate were large, irregular, stony, hard, with slight extension up toward the vesicles. The prostate was so hard that the possibility of prostatic stones was thought of. A roentgenogram excluded this. He had no residual urine. Radium was used in November, 1915. A month later he reported that he had a number of vigorous erections which "gave him hope." The prostate at that time was at a maximum swelling. January 14, the weight was 126. The prostate was much reduced. Dr. Keyes said: "It is more the slight irregularity of the prostate than anything else that suggests carcinoma.""

"I again irradiated the patient, January 18. February 7, he was not up at all at night. He weighed 132¾ pounds. February 22, I irradiated again. April 4, I irradiated once again. When last seen, April 21, his frequency had gone from none at all at night to twice at night because of the radium of April 4. He has a small hard lump in the left lobe and a narrow, hard ridge along the outer margin of the right lobe. The prostate is very flat. This man has gained about 16 pounds in weight. From getting up at night six or eight times, he has had a long period just before the last radium burn of getting up not at all at night. His prostate is markedly reduced in size, but I believe still has carcinoma in it. For six months his carcinoma and the symptoms caused by it have markedly regressed."

SUMMARY.

"By means of radium we have caused the rapid and complete disappearance of two bladder carcinomas out of nine treated. These cases were carcinomatous by cystoscopic appearance and microscopic examination. Time only will tell whether these patients are cured."

"In one case of prostatic carcinoma, treated for six months, the carcinoma and the symptoms have markedly regressed. In another case, treated three months (possibly borderland) the symptoms have improved. Of three other patients treated, one is dead, one has only recently been treated, and one is doing a full day's work but could not be reached for examination."

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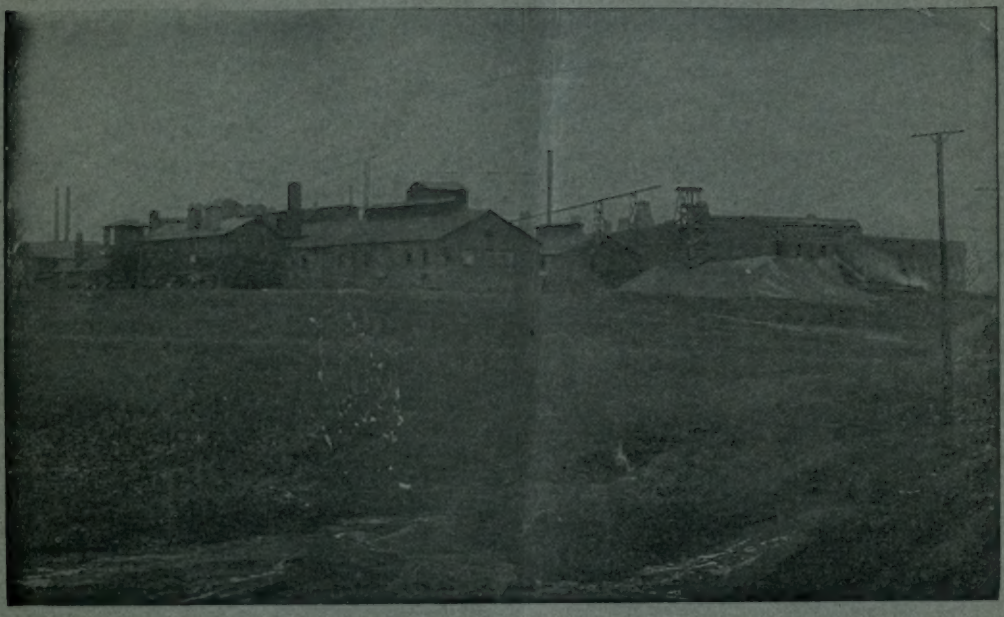

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